1. INTRODUCTION

The cultivated area of vegetable crops grown in Egypt is some what limited according to the population increments. Therefore, intensive efforts are needed to increase yield per unit area as well as expanding the cultivated area in the desert in order to face the increasing demands of vegetables for local consumption, processing and exportation purposes.

Pea (*Pisum sativum* L.) is one of the most important legume crops grown in Egypt during the winter season for local consumption, processing and exportation. The cultivated area of green pods reached 58306 feddan according to the statistics of 2005* produced 245183 tons of green pod yield with an average of 4.21 tons/fed, added to 65 feddan for dry seeds production with total seed yield of 130 tons with an average of 2.0 tons/fed.

Pea is highly required vegetable crop for its high nutritional values due to high protein and carbohydrates content of dry and green seeds. Added to its vitamins A, C, B₁, B₂ and niacin content of green seeds. Pea seeds also had a good content of Ca, Mg, P and K. Moreover, pea seeds is free from toxic materials such favisin in *Vicia faba* and cyanogenic glucoside in *Phaseolus lanatus*.

In Egypt, pea plants are normally grown in the fertile soils of the Nile valley. However, for the expansion of production, it also grown in the new reclaimed sandy soils. Master-B is early

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*Cited from the Department of Agriculture Statistics, Ministry of Agriculture and Land Reclamation, Egypt.*
cultivar of pea, it has a long pod of good yield quality, it is also good for exportation and has a good productive efficiency (Malr, 1999).

One of the major agricultural practices for improving the quantity and quality of green pod yield and dry seed yield of pea are the correct applications of fertilizers that contain the essential nutrients such N,P and K to satisfy plant nutrition.

Phosphorus is one of the essential nutrients required for plant photosynthesis (Repka 1979), it is a component of many vital compounds (Bidwell, 1979 and Edmond et al., 1981), it is also important in the enzymatic system and plays a vital role in cell division and development of merstomic tissues (Bieleski, 1973). Phosphorus is also essential for root development and fruit ripening as well as seed germination, added to its role as an energy carrier through ATP and ADP.

In Egypt under new reclaimed sandy soil conditions with high pH value, phosphorus is easily fixed or converted to unavailable form Ca₃ (PO₄)₂. As well as, farmers are adding chemical fertilizers of nitrogen and phosphorus at high levels had an adverse due to the accumulation of NO₂⁻, NO₃⁻, NH₄⁺ and PO₄³⁻ in plant organs including fruit tissues. Therefore, clean agriculture recently depends on using biofertilizers or organic fertilizers in order to produce high yield with the best quality without contamination and less accumulation of chemicals and heavy metals in fruit tissues.

Biofertilizer application depends on inoculating seeds, soil and plant roots with free living or symbiotic microorganisms in
order to increase these microorganisms in root zone. *Rhizobium* sp, *Azotobacter* sp and *Azospirillum* sp are used for the activation of N-fixation. Some kinds of bacteria, fungi and actinomyces such as phosphate dissolving bacteria (PDB) and Vesicular Arbuscular Mycorrhiza (VAM) are responsible for increasing the availability of soil phosphorus. Clean agriculture apply biofertilizer in order to minimize levels of N and P chemical fertilizers required to get high production of pea yield. Biofertilizer application is also responsible for arising the microorganisms content of newly reclaimed soils.

**The mechanism of these microorganisms depends on:**

1- Nitrogen fixation through symbiotic or free living bacteria.

2- Production of growth promoting substances or organic acids; IAA and Cytokinens, which increase the surface area/plant unit, root length and root hair branching with a considerable increase in the uptake of nutrients from the soil (*Jagnow et al.*, 1991).

3- Producing antibacterial and fungi substances (*Pandey* and *Kumar*, 1989).

4- Enhancing nutrients uptake and protect plants against pathogens (*Sarig et al.*, 1984).

Therefore, this investigation included two separate experiments, the first experiment was carried out to study the effect of different P-fertilizer levels within different biofertilizer applications such as Phosphorin, Microbien and/or Rhizobacterin. The second experiment aimed to study the effect of P-fertilizer source (superphosphate or rock phosphate) within